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Defining Severe Asthma

Announcer:
Welcome to CME on ReachMD. This activity, entitled “Defining Severe Asthma” is provided by the American Academy of Family Physicians and the American Thoracic Society and is supported by an independent educational grant from AstraZeneca Pharmaceuticals LP and GlaxoSmithKline.

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Dr. Yawn
Welcome to the American Thoracic Society and American Academy of Family Physicians’ educational activity on the topic of severe asthma. Today we’re going to talk about Facing Severe Asthma: A Focus on New and Emerging Agents.

Dr. Wenzel
Hi, I’m Sally Wenzel. I am Professor of Public Health, Medicine and Immunology. I’m Chair of the Department of Environmental and Occupational Health in the University of Pittsburgh Graduate School of Public Health. I’m also the Director of the Asthma Institute at the University of Pittsburgh in Pennsylvania. Welcome.

Dr. Yawn
And I’m Barbara Yawn. I am an adjunct professor in the Department of Family and Community Health at the University of Minnesota, and I’m the Chief Science Officer for the COPD Foundation, and we’re very excited about sharing lots of information with you today.

You can see that these are our disclosures for our conflicts of interest.

The learning objectives, there are specific ones for each of the 4 modules. We’re going to start out in the first module talking about making the diagnosis and assuring we have the right diagnosis. In the second module, we’re going to talk about effective communication strategies to help patient awareness and to improve outcomes. In the third module, we’re going to talk about developing evidence-based treatment plans. And in the fourth module, we’re going to review that evidence in the clinical trials on the safety and efficacy of some of the newer medications available for asthma.

So let’s start, as I said, talking about the pathophysiology, the pathogenesis and diagnosis of asthma. Asthma, as you know, is very heterogenous. If you’ve seen one asthma patient, you’ve kind of seen one asthma patient.

Dr. Wenzel
That is true.

Dr. Yawn
They’re going to come in all ages, everything, with different symptoms.

Dr. Wenzel
Absolutely.

Dr. Yawn
But there are some things that are across the board. For example, they all have chronic airway inflammation. One of the big messages we try to give, if you don't have symptoms that day, it doesn't mean it all went away. You still have asthma, so it's a chronic disease. And it's defined by history of recurrent respiratory symptoms. There's a lot of variability in those symptoms from day to day, week to week or season to season, and they have airway obstruction with reversibility and variability, and we're going to talk about how you demonstrate reversibility.

Dr. Wenzel
It's very important.

Dr. Yawn
You can't do it by just looking at the patient. There are other considerations, of course, when you're thinking about how to treat asthma, and those are the associations with allergies, and we realize that there are much greater associations with allergies in adults. We used to say, "Oh, it was mainly kids," but we now know the allergy association is also very heavily with adults.

Dr. Wenzel
Although, you can have asthma in adults without allergies as well, and I think one of the, perhaps, misperceptions of patients is that they presume that if they have asthma, they have allergies, and there often can be a disconnect there, so they don't have to track on a 1:1 basis, but clearly there's a large association with allergies.

Dr. Yawn
Right, and we want to make sure we rule them out—

Dr. Wenzel
Absolutely, absolutely.

Dr. Yawn
—and don't just ignore them. And there are other comorbidities that we're going to talk about too.

Dr. Wenzel
Many.

(laughter)

Dr. Yawn
More than we like some days. So, when we're approaching an asthma patient, especially one that's not doing very well—and I think that's mainly our focus today is—we're not talking about the patient that you see once or twice a year; they really aren't having any problems—

Dr. Wenzel
Right.

Dr. Yawn
—they do very well on very low dose medication. We're talking about the people that are in your office, in the emergency room, in the hospital, and they're just not doing well despite using several levels of therapy.

Dr. Wenzel
Of therapy.

Dr. Yawn
So that's why we really want to make sure when we think about these people, do they actually have asthma? The history, the physical, the spirometry we're going to talk about. If they have asthma and we confirm their diagnosis, what's contributing to that asthma? We mentioned certainly the allergies, but there are several other things. There are other kinds of triggers that are irritants and not allergens, and those triggers can include things like GERD, reflux, for example, and comorbidities. And then we're going to think about, is this severe allergy or severe asthma? And the reason we think it's important is we have newer treatments for severe asthma, and I want to know if this patient has severe asthma because that's when I need your help as the specialist. So, we think then about, if this patient does have severe asthma—or even not severe asthma that I'm having problems with—what can the referral center add? And we're going to go through that.

So, confirming the asthma diagnosis, the first thing, of course, is the history, and we want to think about the people who don't have a diagnosis. I think we've all seen these patients, and we've looked back at their medical record, and they are in for acute bronchitis.

Dr. Wenzel
All the time.

Dr. Yawn
I have to say, I hate that diagnosis. It's kind of a...

Dr. Wenzel
You and me both.

Dr. Yawn
Yeah. But, yeah, they have been in 3 or 4 times a year. They may have seen my partners instead of me, or they were in the urgent care, or they were in the ED, and so I missed the fact that there is this recurrent problem. When you see that, you need to think that this might be asthma and then go ahead with evaluation. I think that's important. Certainly, someone with a history of allergies and a long-term history of allergies and then they're getting respiratory symptoms—

Dr. Wenzel
Certainly.

Dr. Yawn
—that is... And the family history, it does run in families.

Dr. Wenzel
Yes, it does.

Dr. Yawn
And so, if we have a mom and a dad or a big brother that has asthma, we should think this person may too.

Physical exam: Actually, there may be nothing on the physical exam.

Dr. Wenzel
Mm-hmm.

Dr. Yawn
And I think that's confusing sometimes that the patient says, "Well, somebody diagnosed me with asthma a month or 2 ago," and you see and hear nothing, but sometimes, if you look a little closer, you will see some things like the allergic shiners that we see, the dark circles under their eyes. If they're having symptoms—wheezing, coughing… Some people don't wheeze; they only cough primarily. And we need to talk about spirometry as being part of what we use. I have to say I don't use it still on every single person with asthma if they have very mild asthma.

Dr. Wenzel
Mild disease.

Dr. Yawn
But, if we get beyond that, I'm amazed, when I do do spirometry, it's almost always worse than I thought it was going to be.

Dr. Wenzel
And I would just add one of those simple things. In most people's office, there is, in fact, an otoscope on the wall, and actually, I think often it's not the used enough, and if you look in the nose of patients with asthma, sometimes you will find things in the nose like a lot of inflammation, a lot of mucous, sometimes even nasal polyps in the nose. And then, if you look down the back of the throat, you'll see postnasal drip, which again goes along to your point. With an allergic, chronic, inflammatory process in the upper airways, that often contributes to asthma in the lower airways.

Dr. Yawn
That's a really good point because looking in the nose is not always easy, and using the otoscope is a great idea.

It isn't always asthma. That's one of the points that we want to make. Some of these people have very difficult disease to deal with. It's because we're treating the wrong disease, and they're not likely to get their whatever better when we're treating it for asthma.

Dr. Wenzel
Yes.

Dr. Yawn

And there are a couple of studies I think are kind of interesting. The first one, these were difficult-to-treat asthma patients, not the kind that I usually see in my office but the ones you see in your office.

Dr. Wenzel
In my office, absolutely.

Dr. Yawn
Right. And of those, 35% of them turned out not to have asthma, and that's why we were having so much trouble. And we think, "Oh, well, that's just the difficult ones," but it turns out, when they looked at the more mild to moderate, a significant number of them, about a third of them who were being called and treated for asthma actually didn't have it either, so we really need to confirm the diagnosis.

Dr. Wenzel
It's probably the most important point when you see a patient whose respiratory symptoms are difficult to control.

Dr. Yawn
And we don't have a simple test. It's not like we have a hemoglobin A1c. I can say, "Oh, if it's 7 or 8, they clearly have diabetes." Well, I don't have one like that.

Dr. Wenzel
We don't have that with asthma.

Dr. Yawn
Yes. Spirometry comes as close, I think, to helping us with the hemoglobin A1c concept as pretty much anything, and most primary care physicians can do spirometry if they choose to. They just don't always choose to. We know somewhere between a third and two-thirds of primary care physicians have them in their office now. They may be sitting in the back room, but they do need to be used. And the reason they're important is, again, in these people with more difficult-to-treat disease, we need to do the pre and the post bronchodilator spirometry, and this is where we see that reversibility we talked about. And you can see over there in the picture the pre is the orange, and when you give them the bronchodilator and wait 15–20 minutes, then you get the blue. More air can go in and out once they do have the bronchodilatation. And if it's 12% or more increase in the FEV1, which is the forced expiratory volume that first second, or the forced vital capacity, what they blow out in the first 6-8 seconds when they try to empty their lungs, either one of those you get a 12% increase, that's reversibility. We also would like it to be 200 CC. Fortunately, that isn't so important in most of our asthma patients—maybe some people with really severe lung disease—but this reversibility is important.

Dr. Wenzel
And I would emphasize though that the FEV1 is probably the most important of these. Sometimes if patients take a deeper breath, they will actually be able to improve both their FEV1 and their FVC 12%, so you'd like to actually see that the improvement in the FEV1 is a little bit more than the improvement in the forced vital capacity, and that is almost certainly a hallmark of asthma.

Dr. Yawn
There are times when we have to think of things that are masqueraders.

Dr. Wenzel
Yes.

Dr. Yawn
And these are the ones that I probably send off to you. Yes, I do most of the interpretation for the spirometry for most of the patients, but there are patients that they have a normal spirometry. The FEV1 is above 80% of predicted, the FVC is where it should be, but they're really symptomatic. I find those patients confusing and really would like help—also, the ones that don't have bronchodilator response. Now, that may be that they have COPD, and if they're the proper age, then I may be thinking about that if they have exposures, but in a 20-year-old that has no bronchodilator response, something else must be going on.

Dr. Wenzel
It gets very confusing.

Dr. Yawn
It does. And then, of course, the abnormal ones, the one I expect to see is obstruction and reversibility, but we have some that have an atypical pattern or they have restrictive lung disease. Those are the ones that don't fit anything that I'm comfortable treating and that I need you to see.

Dr. Wenzel

Mm-hmm.

Dr. Yawn
So, vocal cord dysfunction, I know this is one that you've spent a lot of time with and see a lot, so I'm going to let you talk about this one.

Dr. Wenzel
So, vocal cord dysfunction, at least from my perspective, is probably the biggest masquerader of difficult asthma. We see it all the time. And I think to your point about pulmonary function testing that's normal and the patient is still symptomatic, how can that be? And we unfortunately see time and time again that if the patient manifests symptoms of asthma, even if the physician has gotten pulmonary function testing and sometimes multiple times and it's always normal, they still get a diagnosis of asthma, and they keep getting more and more and more asthma medications with more and more side effects from the asthma medications.

Dr. Yawn
Right.

Dr. Wenzel
So, if you see that situation where you have somebody who is having symptoms and has normal spirometry, the first thing you should think about is vocal cord dysfunction.
And so, what is vocal cord dysfunction? It's the paradoxical inspiratory closure of the vocal cords. It is induced or spontaneous. It can arise around odors, fumes, etc., or it can happen all by itself. It requires an inspiratory spirometric evaluation and/or a laryngoscopic look at the vocal cords.

Vocal cord dysfunction is a problem of inspiration, and the vocal cords normally should be open during inspiration, and you can see on this slide over here that the pictures of the vocal cords, the one to the left under the spirometric image, the vocal cords are open. That's what they should look like during inspiration. However, the one next to it, you can see that those vocal cords are closed pretty shut. That's what happens in vocal cord dysfunction. They close during inspiration. And often you will ask a patient, "Is it harder to breathe in or breathe out?" And they'll even tell you, "It's harder to get my air in." And you can see that when those vocal cords are closed, it would be awfully hard to get air passed those vocal cords. So you can certainly look at the vocal cords and prove it that way, but you...

Dr. Yawn
Well, it's not very likely I'm going to look in my office, but I can do something else.

Dr. Wenzel
But you can do spirometry.

Dr. Yawn
Right.

Dr. Wenzel
And you can see that the upper half of that graph is breathing out. The lower half is breathing in. And a normal what we call flow volume curve is the one to the left where they are sort of mirror images of each other, so they get a good flow on inspiration and they get a good flow on expiration. But the one next to it, you can see that the top part, the expiratory part, really looks normal. It's that lower half where the patient starts taking a breath in and then it cuts off, and it cuts off because those vocal cords close, and so they can't keep increasing their inspiration. It reaches a plateau very quickly, and they can continue to breathe in, but it's at a much slower sort of flow rate, and they eventually get to a full—they fill up their lungs and then they breathe out, and when they breathe out, lo and behold, it's normal. It looks exactly like the curve to the left. So this, I think, can be a very helpful test to do in primary care, but you do have to make sure that you're getting a good effort on inspiration—

Dr. Yawn
Right.

Dr. Wenzel
—because if the patients aren't coached well, then you can get this sort of flow volume loop even in the absence of vocal cord dysfunction, so it is important to have good coaching there.

Dr. Yawn
Well, and I always sort of laugh. I've had more teenage boys with vocal cord dysfunction and restrictive lung disease-looking spirometry, and it's simply because they're not really trying hard.

Dr. Wenzel
They're not really trying, yep.

Dr. Yawn
Once they try hard and you say, "Yes, that's it," then they can do it.

Dr. Wenzel
They can do it, yep.

Dr. Yawn
But this is really important because I think we do have a lot of these patients and we don't know that they're there. We're missing them.

Dr. Wenzel
And I think with the appropriate history and spirometry, you can diagnose probably at least 90% of them.

Dr. Yawn
And then I am going to send them on probably though because I don't treat vocal cord dysfunction, and that is beyond the scope of this, so we're not going to go into that right now.

But these are the warning and imitation. Do you want to go through this?

Dr. Wenzel
So I think of them as red flags. So, if you have a patient who's got a long history of multiple trips to the emergency room, multiple courses of prednisone over the years, maybe they tell you that they've got episodic cough, shortness of breath—again, especially around things like perfumes, walking through the aisles of a department store, through the perfume aisle, "I can't breathe; I can't breathe"—they believe that they have allergies to things like roses and perfumes… And you actually can't have an allergy to roses or perfumes. Those are irritant reactions. If you ask them, "Do any of your asthma medications actually help you?" they'll go, "Well, no, really none of my asthma medications help me." And as I already said, they have problems getting their air in. It's really hard to get the air in as opposed to get it out. The symptoms persist despite normal lung function testing, and one of my most important tests that I like to do is to bring a patient in when they're most symptomatic and say, "You tell me when you're having problems. Then come in and we'll do spirometry on you. And if it's normal, it is almost certainly not asthma," when they are having symptoms you've done normal spirometry.

It can be associated with gastroesophageal reflux disease, postnasal drip, and anxiety, and I can understand why you would certainly want to refer these patients to a specialist, but sometimes if you treat these patients for those comorbid conditions, you can actually dramatically improve their symptoms and prevent them from going to the emergency room.

Dr. Yawn
Well, and most of us can certainly treat GERD initially anyway—

Dr. Wenzel
Of course.

Dr. Yawn
—and the postnasal drip and anxiety—

Dr. Wenzel
Anxiety.

Dr. Yawn
—to some extent.

Dr. Wenzel
That's what primary care does in many cases because those are such common diseases.

Dr. Yawn
They are. So the abnormal spirometry, we've talked about those. The obstructive pattern, this is where they have a low FEV1, they can't get a lot of air out in that first second, and the ratio of the FEV1 to the FVC is low. Now, that is something that we can see in asthma—

Dr. Wenzel
Mm-hmm.

Dr. Yawn
—but we can also see in COPD.

Dr. Wenzel
Yes.

Dr. Yawn
And we know that, yes, people with COPD can have reversibility, but they usually don't get back to a normal FEV1. Their FEV1 is actually not up above 80 to 85—

Dr. Wenzel
Right, right.

Dr. Yawn
—percent of predicted, so that helps. But then there's other things like bronchiectasis that you'd have to think about. And again, if I see someone and I think they have bronchiectasis, it's a referral.

Dr. Wenzel
Gonna send them off to me.

Dr. Yawn
Right. And the restrictive pattern, some of those you know by looking at the patient, looking at their BMI, that they probably have restrictive because they have a very large chest with lots of weight on their lungs and they can't expand, but they can also have interstitial lung disease. So, if you've got someone where you don't think this makes sense that they have anything that could be restrictive, they, again, need to be sent on. And then the mixed patterns where they have a low FEV1 and a low FVC and the ratio is still abnormal, those people, yes, they have all kinds of possibilities—

Dr. Wenzel
Yes, they do.

Dr. Yawn
—none of which I'm going to deal with primarily. I'm happy to co-manage after you make the diagnosis—

Dr. Wenzel
Yes, after making the diagnosis.

Dr. Yawn
—and start treatment, but that's why it's so important, because we see all of these things that are potentially going on when we have difficult-to-treat asthma that may not be asthma.

So, why not spirometry? And this is something I've dealt with for many years. Many of my colleagues have some excellent reasons why they don't do it in their office, but there are some that I don't think we should just say, "Oh, yeah, that's right." One is don't get paid. We actually do get paid if you use the proper codes, and there are codes for all the different levels of testing. Pre and post bronchodilator, you get paid more than only pre. The other thing is you don't ever want to say, "Oh, I'm following up their asthma." You want to give a reason for doing the test. We all know that's how you get tests reimbursed and not just bundled into something. And most of the time that's exactly what you're doing. You're evaluating their cough, their shortness of breath, something like that. And then there's the problem of it's disruptive to practice. Now, that one I completely understand that it can be if you suddenly have one in the middle of the day. Just like if you suddenly need an EKG or you suddenly need something else, it is disruptive. That's why I think if you can think ahead and schedule those people before you start seeing patients, over the noon hour, maybe at the close of the day, but more at special times when you say, "Yes, I know that my MA or nurse" or whatever "is going to be busy doing spirometry," then those are times I try to not being seeing patients. I think you can work it in. And there's always going to be an occasional disruption, but it's only occasional.

The solutions: Again, I think we need an attitude change. As I said, you can't diagnose many of these diseases or conditions, chronic conditions, without some kind of a laboratory test. Well, you can't really diagnose difficult-to-control asthma without the appropriate lung function testing.

Staffing: If you have 2 or 3 people trained to do this, then if somebody's on vacation, you still have somebody, or we know young MAs may go out on maternity leave or something, you have a backup, and I think that works very well. They do need to do this often enough so they keep up their skills, and that's why you need to use it regularly in the patients where it's appropriate.

And as I said, the timing of the test, before or after you start seeing patients, during the noon hour, some time where taking your MA or nurse away from working with you is not going to totally disrupt your practice.

Is this severe asthma? I think that's one of the questions we ask regularly. And one of the first things I think we need to do is we need to talk about control. Severe asthma we say the patient is out of control. Unfortunately, in primary care we don't often assess control. We ask something about, "Well, how is your asthma doing today?" And you get either...

Dr. Wenzel
"Oh, it's okay."

Dr. Yawn
Yeah, which I have no idea what that means.

Dr. Wenzel
What does that mean?

Dr. Yawn
Yeah, so I think we need to use these tools. Now, there are several tools that are available. Most people know about the ACT, and the other 2, the ATTACK and the ACQ, are not used so much in the United States. The asthma APGAR is one that's been designed specifically for primary care, and I'm going to talk a little bit more about it in a second—right now in fact. The reason this was designed for primary care is the top part asks about activity changes and symptoms, daytime and nighttime, and those are the 3 major factors for asthma control, but then it goes on to ask about the things that most commonly adversely effect control—triggers, what makes your asthma worse—and there are some allergens and there are some irritants there. The next part is asking about if you have asthma medications, how do you take it, because patients frequently are not doing what you think you've agreed they are going to do. One of the things I find regularly is people confusing the quick relievers with the maintenance.

Dr. Wenzel
That's all the time.

Dr. Yawn
And they'll say, "Oh, yeah, I use this one prn," and it turns out it's an inhaled corticosteroid with a bronchodilator. That's not your prn medication. So this one allows you to do it. It also allows to help with the question of adherence—that we'll talk about a little bit more—but, "Why are you not taking your medicine?" instead of saying, "You are taking it, aren't you?" which always is, "Oh, yes, doctor, I'm taking it."

Dr. Wenzel
Of course.

Dr. Yawn
That's not a good way to ask.

Dr. Wenzel
You always want to please your doctor.

Dr. Yawn
Yeah, because you never know what's going to happen if you don't.

Dr. Wenzel
Exactly.

Dr. Yawn
And the last one is: When I take my breathing or asthma medicine, I feel worse, no different, a little better or a lot better. I can see this helping in the vocal cord dysfunction, for example.

Dr. Wenzel
Absolutely.

Dr. Yawn
"I take it and nothing happens." So this is the asthma APGAR and one of the tools you can use to assess control.

It is linked then to an algorithm, which I think is also different than any of the others. It does suggest the steps you go through. You assess, if someone's not doing well, inhaler technique, their adherence, triggers, smoking, and consider doing lung function testing

before you simply step up the medicine. Sometimes it's a knee-jerk reaction, "Oh, I'll just give him more."

Dr. Wenzel
It's easy.

Dr. Yawn
It is.

Dr. Wenzel
You don't have to think.

Dr. Yawn
Yeah, except then they're back.

Dr. Wenzel
Right, and they're not doing well.

Dr. Yawn
Right, and then I have to think even more. So, instead of just upping the medicine, see if one of these is the problem. If it is, fix it. Have them come back. If they're still not better, then you may have to up the medication. And if I've been through this loop a couple of times and they're still not getting better—that's the one on the bottom—let's send them off and have someone else help me with this.

Dr. Wenzel
Figure it out, right.

Dr. Yawn
There is the other side of the people who are doing well, and it just reminds you, when they are doing well, you want to take that opportunity to reinforce some of the education that we'd like to have time to do.
So the stepwise approach to asthma management has always been there in the guidelines, and it does talk about stepping up therapy if people are out of control. We're not so worried about the people at step 1 that go to step 2. Okay, a lot of people do. They start getting in step 3, okay, but when they get to step 4 and 5, those are the people we're talking about with difficult-to-control asthma and potentially severe asthma, and so it's just easy to remember, you're at step 4 or 5, you need this think to go to the next steps in evaluation too.

Severe asthma, we'll talk about that, and I'm going to let you define that in a minute, but it's really important to realize that of all of our people with asthma, about 20% have difficult-to-control asthma. Now, a portion of those people are going to have something that I can handle, or can try at least, like poor adherence, inadequate inhaler technique, a trigger.

Dr. Wenzel
Correct.

Dr. Yawn
Somebody's smoking in the car or the house, and I can help do something about that, but there is that 5–10% of all people with asthma that I can do everything that I know how to do and they're still not getting better. Those are the people that have severe asthma, and you're going to tell us about the definition in a couple minutes. So the criteria may be higher in some clinical practices. We don't know that.

The factors that contribute to uncontrolled asthma, we've talked a little bit about those, but I think they are important. There's the environmental factors, there's the disease-related factors and there's the patient-related factors, and all of those need to be addressed, but then there's also the physician-related factors that we really need to address, and that's underprescribing. Although, I don't worry about underprescribing a great deal. I think we do more overprescribing.

Dr. Wenzel
Overprescribing.

Dr. Yawn
Yeah. The failure to assess adherence, the failure to assess inhaler technique, assuming the pharmacist is going to do it, and pharmacists don't have time either and they frequently don't do it, so nobody does it, the misdiagnosis, the lack of an asthma action plan, the patient gets worse and they really don't know what to do about it, so they end up in the emergency room or somewhere else, and then the absence of specialty care when we have a problem that we really don't know what to do about. So I think all of those are really important and need to be addressed, and we'll talk about some of them again like the comorbidities, but I think that it's a nice way to think about what should we evaluate, what's going on in their lives.

So, poor adherence to asthma therapies really is a problem. I mean, we always know, "Oh, yeah, my patients are very adherent. It's your patients that are a problem." About 50% of what we prescribe ever gets taken in the first place. Eight-two percent of patients with asthma don't fill their inhaled corticosteroid prescriptions for a lot of reasons. Some of them are cost, but there's also fears and concerns, and there's, "Well, you know, I feel pretty good right now, so I don't need it. My asthma is cured."

Dr. Wenzel
Mm-hmm.

Dr. Yawn
Wrong answer. And then there's the 11%, even in clinical trials when somebody's calling them once a week, are still not taking their medications at least 80% of the time.

Dr. Wenzel
And I would say asthma therapy is complicated. It's not like you can just take a pill in the morning to treat your high blood pressure or whatever. You have to use an inhaler. You have to rinse your mouth. There are a lot of other steps. And I think if you look at the statistics that have now been done on adherence, it's not just asthma patients that have this poor adherence. It's literally every disease. Any chronic disease that requires taking medications on a regular basis patients are not likely to take them nearly as often as we would like them to, and so I think we have to sort of step back a little bit too and not necessarily blame the patient for not being adherent to their therapy, which sometimes I've seen some of my colleagues do. I think we actually want to understand why it's difficult for them to take their medications and then address those concerns and help them to take their medications on a more regular basis.

Dr. Yawn
I agree completely. So, define severe asthma for us.

Dr. Wenzel
Well, I think we've set the stage very nicely in defining severe asthma. Certainly, you have to go through all the steps that we've gone through already. You've got to, number one, make sure that it actually is asthma. You've got to understand are there comorbidities that are contributing to making it worse. Maybe it's really not as bad as it seems if you treat some of these comorbidities, including things like adherence and exposures, etc. But once you've gone through all of those steps, then what are you left with? So you're left with a patient who you've addressed all of these issues who really has asthma and this asthma is such that requires treatment with high doses of inhaled corticosteroids plus a second controller or systemic corticosteroids—prednisone, Medrol—to prevent it from becoming uncontrolled or which remains uncontrolled despite all of that therapy, so it's a very specific definition. Now, it's still a clinical definition. There's no hemoglobin A1c in there. It's still a very clinical definition. And so, unfortunately, asthma, and severe asthma in particular, are really umbrella definitions. They identify groups of patients that, again, we can all sort of recognize who have changes in lung function, who have a set of symptoms that track along with asthma, who may or may not have exacerbations, and they have these in some mix that makes it very personal to each one of those patients, but it really doesn't tell us anything about underlying what's driving their disease.

So we're going to move now to some case studies that will actually hopefully help us to think about that difficult case that comes into our practice and how to deal with it. So we'll start with case number 1. This is John. John is a pretty typical 34-year-old, happens to work in construction. He's had asthma or a diagnosis of asthma since he was a child, since the age of 10, which is probably when the majority of asthma cases start. His chief complaint and history of present illness is that his asthma is interfering with his work. His boss actually told him that he had to get it checked out. "You're not working as efficiently and productively as you used to work because you have to go off and take your inhaler every now and then." He's actually already on the highest dose of long-acting beta agonist and inhaled corticosteroid that is marketed, so he's on a good therapeutic regimen, and he's actually had a large increase in his doses over the last year. He went from being on low doses to now being on high doses, and despite that, despite that, he's still taking his albuterol, his rescue medication, 3–4 times a day. So, what do we do next?

And I think there's a lot of things that are really important in this situation. This is a pretty common situation, and I think it's important to address, "Gee, how good is his control at this point?" And it doesn't sound like it's going to be very good based on what he told you today, but we actually did the APGAR and it's 5, which is not very good. His ACT is 15—his asthma control test—again not very good. If you look at his activity modification at least weekly, he had a score of 1, symptoms at least 4 days in the past 2 weeks, got a score of 2 on that, and he awakened twice in the past 2 weeks, which is a lot. If you're waking up with asthma, that really is indeed a red flag. So his total score was 5. He's not in control. Clearly, he's not in control. But he's not sitting there needing to go to the emergency room. He's just not well-controlled. But, in fact, he was in the emergency room, the emergency department, about 6 months ago for an asthma attack. So he's sitting there in your office. Doctor, what are you going to do now? What's our next step? Do we just increase his medications?

Dr. Yawn
I hope we don't.

(laughter)

Dr. Yawn
I hope we think about it a little bit first. You know, you say he's a construction worker. Is there something in construction? I know that a lot of guys and gals out on the construction site may be smoking. Is he around tobacco smoke? Is he doing construction outside or inside? Is there a lot of sawdust? What else is going on in his environment? I'd like to know that. And then I want to know, is he taking that medication that I think that we have agreed on?

Dr. Wenzel
Oh, clearly incredibly important points. So we ask a little deeper questions, and we find out that John cuts grass, he gets worse around—when he's cutting grass, and he's worse around trees that are blooming and when he's around tobacco smoke. He doesn't smoke, but on his construction site, to your point, most of his buddies actually do. Now, when we talk to him about his medication use, he says, "Yeah, I'm taking my medication on most days." Well, that's always a little bit... You know, you're a little uncomfortable with that. And then you try to get a little bit more granular. "Well, does that mean you're getting it every other day? Does that mean you're getting it once a day, a couple a days a week?" You really do have to do that deeper dive.

Dr. Yawn
Right.

Dr. Wenzel
And then you kind of understand that, oh, he's also had some social events in his life that are important to understand too. He's recently divorced. I've never been divorced, but I can certainly imagine that it's a pretty traumatic event to go through and the rest of your world kind of falls apart during that time, so he's a little less organized. And then, of course, you've got the insurance and reimbursements and what's on the formulary, and lo and behold his pharmacy actually changed his inhaler. It's a similar type of inhaler, but it's not the same that he was on before, so all of those things I think are things to pay attention to. And then his response to therapy, he says it usually worked, but he felt that he had a better response to that old medication before his pharmacy changed what they filled for his prescription.

So, does, in fact, John have severe asthma? Again, we've got to work through all of these various aspects of understanding his level of adherence, comorbidities, etc. So the first thing you've got to do is to understand his inhaler technique and does he have good or poor technique. He actually didn't have such great technique when we actually addressed it. And, of course, most of the studies would say that that's something that literally every time you see an asthma patient you should go through their inhaler technique because even though they demonstrate good technique one time, the next time they're very likely not to have good technique. And, of course, we have multiple inhalers, so he's retaught with the new inhaler. Because of his persistence of his testing, we, in fact, got spirometry on him. And, of course, as we've kind of tried to emphasize with the vocal cord dysfunction, it's important to not just review the numbers but to actually look at those flow volume loops. Is there evidence of a vocal cord problem? And when we look at the numbers, his flow volume loop looks actually good, but his FEV1 is 75%, and his FVC is 82% of predicted, so he's got a ratio that's 0.73. Now, many of us would be influenced by the COPD literature, which would say, "Oh, well, he's more than 70%, so he's not obstructed." But in fact he's 34 years old. He is not your 65-year-old COPD patient.

Dr. Yawn
Right.

Dr. Wenzel
And so that ratio of 0.73 is actually pretty obstructed for a 34-year-old. And then we give him albuterol, and he has an 18% improvement in his FEV1, which pretty much confirms that the man does have asthma and that he has evidence of ongoing obstruction. So we want to evaluate for other things that might be making his symptoms worse, things like gastroesophageal reflux disease, things like postnasal drip and rhinosinusitis. And then I think probably one of the most important things is encourage him not to hang out with his buddies who are smoking or at least maybe have him even more appropriately encourage his buddies not to smoke because clearly that's a big issue too. And then I think just from the standpoint of having a little bit of background information on this patient, getting a complete blood count with a differential, not just a complete blood count, and then to consider things like allergy testing and IgEs.

Dr. Yawn
And the complete blood count, you're not really looking at the white count total. You're really looking at eosinophils.

Dr. Wenzel
I'm really looking at eosinophils. And I think this is something we'll spend a lot of time talking about later on, but it's such a simple test,

and it can give you so much information.

Dr. Yawn
Well, and a lot of times, if you look in the chart, you have a couple of white counts with differential over the last 3 or 4 years, and you can see then—kind of track it over time.

Dr. Wenzel
Oh, absolutely.

Dr. Yawn
"Oh, look at that, it's been elevated for quite a while."

Dr. Wenzel
And sometimes you get really lucky and a patient has had a blood count done when they went to the emergency room before they got their steroids, and in that case often times that can be very helpful because then you will see a real spike in their eosinophils.

What about treatment? Well, certainly, we want to reinforce the inhaler technique, so obviously every time you see the patient. You want to focus on adherence. There are some studies now out to suggest that measuring things in your exhaled breath—that we'll talk about a little later on—called exhaled nitric oxide can actually help us identify whether the patient is taking their medications on a regular basis. Certainly, you want to treat their heartburn. You want to treat their rhinitis. You could consider adding a third controller medication, so a long-acting muscarinic agent or leukotriene receptor antagonist. But I think it's really important to follow this patient. So, don't just say, "Okay, your asthma was not under great control. Here we did these things. See you in 6 months." It's really important to say, "No, I need to see you in 3 or 4 weeks. I need to follow up on this," or consider a referral.

Dr. Yawn
And I think that's what we really in primary care need to keep doing more of, having those patients come back, because it does make a difference. You don't want them to come back in 6 months when they have been to the emergency room 3 times before you see them.

Dr. Wenzel
Three times, exactly.

Dr. Yawn
You want to be proactive and see them when they're not having an exacerbation hopefully and you can see, what you did, has it made any difference.

Dr. Wenzel
And you can learn a lot about patients by seeing them a little bit more frequently as well.

So let's move on to our next patient. So this is Janice. Janice is a 23-year-old student. She comes to student health for follow-up. And student health is kind of a busy place, and sometimes you don't get all the attention that maybe you could actually use. And she's been to the emergency department 3 times this year for her asthma. She was diagnosed in her teens. She's never been well-controlled right from the start and has been really back and forth into the emergency department every year since her diagnosis. She is on a whole boatload of medications, including her short-acting beta agonist, her combination therapies, and now she's even on a leukotriene receptor antagonist. So, what do you do now? What do you do in this case?

Dr. Yawn
Somehow I see some red flags—

(laughter)

Dr. Yawn
—you talked about showing up here. I probably… Yes, in addition to inhaler technique and adherence, I better get that spirometry and maybe the inspiratory flow.

Dr. Wenzel
Mm-hmm. No, I think this is... To have asthma develop in the teenage years, certainly it does, but then to be poorly controlled right from the start, to be on all of those asthma medications and not having a response to therapy, you really want to say, "Is this asthma?" That's the most important. And lo and behold, when you do even a peak flow and she's still saying she's having some wheezing, her peak flow is completely normal and it's 450. That's a pretty good peak flow. But, despite that, her APGAR says she's not in control. Okay? So there's a disconnect. And she looks and circles triggers of cold air, exercise, cigarette smoke, and writes in perfumes—again, more red

flags here. She takes most of her asthma medications most of the time. She identifies albuterol that is her quick relief medication, and she identifies that her other medications are daily, regular medications. But when you ask her do her asthma medications help very much, she says a little. Well, again, that's another red flag that her asthma medications aren't helping her very much. So, are you comfortable with the asthma diagnosis? I'm not.

Dr. Yawn
And I'm not anymore either for sure.

(laughter)

Dr. Wenzel
So, what are our next steps? Well, again, all the good things that we've talked about—making sure her inhaler technique is good and seeing if she's adherent. And she doesn't really describe allergen triggers. None of those things that she said made her asthma worse are really allergic triggers. She talked about irritants, and so we're going to do our spirometry, not consistent with obstructive lung disease, surprise, surprise, and she had such a good peak flow, but they are consistent with vocal cord dysfunction. She's got that flattening of her inspiratory flow volume loop.

So, what are our next steps? Again, further questions, "Is it harder to get the air in or to get it out?" Well, getting in is harder. "I'm gasping for breath." And one of the other things that people will say is, "People hear me wheezing across the room." If anyone say that their friends and family tell them they're wheezing across the room, it's probably not asthma. It's very difficult to hear lower airway wheezing across the room. Upper airway wheezing you can hear. Heartburn, yep, she uses Tums and she uses them fairly frequently, and being a student, it can be pretty stressful. Postnasal drip? No, she doesn't have that. She does have some anxiety though.

Dr. Yawn
Right. And we did use the GAD-7, which is a 7-question screening tool for anxiety and I think is a great way to figure out they have anxiety, because just to say, "Well, are you anxious?" if they're a college student, of course they're anxious.

Dr. Wenzel
Absolutely.

Dr. Yawn
They've got to that take tests. But this is a more global measure, and I think it's very helpful.

Dr. Wenzel
Yeah, and again, anxiety, postnasal drip, heartburn are all things that you need to think about when you're worried about vocal cord dysfunction. So we think she's got vocal cord dysfunction. We're going to treat her heartburn, give her some breathing techniques, and again, have her come back. Don't send her out for 6 months to return later. And we start to taper back on her asthma medications. This is such a wonderful thing. One of the happiest days of my life is when I can take patients off of medications as opposed to adding more medications.

Dr. Yawn
Well, and this one is especially important to have back maybe 8 weeks but maybe even sooner because this is the person who has a test, gets more anxious, got more wheezing, ends up back in the emergency room, and they put her back on all those medications again.

Dr. Wenzel
Oh my goodness, they do. They go...

Dr. Yawn
So...

Dr. Wenzel
Those doctors that treat you regularly, they don't know what you're doing. We see you now and we're going to put you on oral prednisone.

Dr. Yawn
Right, so these really you need to see frequently—

Dr. Wenzel
Absolutely.

Dr. Yawn
—until you get them back to maybe no asthma medicines at all.

Dr. Wenzel
Which is the hope.

Dr. Yawn
Yes.

Dr. Wenzel
Absolutely, which is the hope.

Dr. Yawn
So, thank you. I think this has been very useful to think about is it asthma, and if it is asthma, is it uncontrolled asthma, and then is it severe asthma. And we're going to go on and talk about some more of severe asthma in the next module.

Dr. Wenzel
On behalf of the American Thoracic Society and the American Academy of Family Physicians, thank you so much for joining us for this very important educational program.

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